# Enhancing Human-Centered AI Systems through Advanced Requirement Engineering Technique

**SHORT SYNOPSIS**

*Submitted in partial fulfillment of the requirement of the degree of*

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*by*

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Date:10/10/2025

## DECLARATION BY THE SCHOLAR

I hereby declare that the short synopsis entitled **Enhancing Human-Centered AI Systems through Advanced Requirement Engineering Technique** being submitted in partial fulfillment of the requirement for the degree of Doctor of Philosophy in the Department ofComputer Science and Technology under the School of Engineering of Manav Rachna University, Faridabad during the academic year 2025-26.

It is the work that is expected to be carried out under the supervision of Dr. Jyoti Pruthi, Professor, MRU and co-supervision of Dr. Hardeo Kr. Thakur, Associate Professor,Bennett University, Greater Noida.

Further, it is declared that the short synopsis is within the plagiarism limit and copy of the same is attached as per the University norms.

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## CERTIFICATE BY SUPERVISOR(S)

This is to certify that, the short synopsis entitled **Enhancing Human-Centered AI Systems through Advanced Requirement Engineering Technique** is an original piece of work done by research scholar **Ms. Meenu** under the supervision of **Dr. Jyoti Pruthi, Professor, MRU, Faridabad** and co-supervision of **Dr. Hardeo Singh Thakur, Associate Professor, Bennett University, Greater Noida** for the degree of Doctor of Philosophy in the Department of Computer Science and Technology under the school of Engineering of Manav Rachna University, Faridabad during the academic year 2025-26.

Further, it is certified that the short synopsis is within the plagiarism limit and copy of the same is attached as per the University norms.

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# Abstract

Development of Artificial Intelligence software is considered a new field. This field has various obstacles and issues. The lack of established best software development practices affects the overall efficiency and technical implementations. AI software is becoming part of our lives and we are increasingly dependent upon AI for our daily life decisions. Therefore, it is crucial to incorporate human – centered approach in these AI software. Various scholars, organizations and institutions are involved in identify and recommend various aspect of AI ethics. It is essential for sustainable development of AI software. In various software used in industries such as healthcare, the inclusion of human ethics, transparency, and unbiasedness are more essential and their inclusion need to be ensured. Therefore, a new paradigm, known as "Human-Centered AI" (HCAI) has emerged, which centers the AI system around human needs, values, and well-being. It aims to develop AI solutions that improve human skills while upholding social norms and ethical standards.

In current practice, the process of software development implements ethical and human aspect of software in the designing phase. This leads to chance of prejudice and unfair decisions from misrepresenting human aspects in requirements for model selection and data utilized in training AI systems. Here, the underlying computer processes may be impartial. Thus, it is crucial to include ethical aspects at the beginning of software development process i.e. at the requirement engineering phase. The early inclusion of ethical concepts in software development would lead to more impartial, inclusive, and accountable AI-based solutions.

This study aims to learn various ethical issues and challenges in incorporating ethical aspects into AI software. We also analyze current approaches to incorporating ethical aspects in the requirement engineering phase. The analysis will be used to develop and validate a framework for implementing Ethical Requirement Engineering (ERE) for Human-Centered AI.



**Keywords:** Artificial Intelligence, Software, Human Centered AI, Ethical Requirement Engineering.

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# 1. Introduction

The rapid progress of Artificial Intelligence (AI) technologies has begun a new era of innovation. It holds the potential to revolutionize society in multiple ways. AI systems are increasingly impacting people's lives and their decision making. The areas such as healthcare, finance, transportation and education are most influenced by AI software. This integration has also highlighted importance of including ethical issues regarding alignment of human values, justice, accountability, and transparency etc.

## 1.1 Human-Centered Artificial Intelligence (HCAI)

"Human Centered AI" (HCAI) is a new approach that help to address the ethical concerns of AI software. It helps to create and develop software that emphases on human needs, values and overall welfare. The goal of HCAI is to ensure that ethical and social concerns are addressed with continuous enhancement of human capabilities. Therefore, a comprehensive framework is required that include ethical considerations from very beginning of software development life cycle. The framework will help in development of ethical software.

Requirement Engineering (RE) is the first phase of software development that determine capabilities, limitations and boundary of software. Most of the considerations, including ethical aspects should be identified in this phase. However, in most of traditional RE approaches, these ethical aspects are not included and therefore, not integrated in final products. A specialized field, known as Ethical Requirement Engineering (ERE) has emerged to address this important issue. The goal of ERE is to identify human needs and ethical considerations during the requirement engineering phase.

## 1.2 Ethical Requirement Engineering (ERE)

Even with the growing focus on AI ethics, it is still very difficult to translate abstract ethical ideas into specific, workable specifications for AI software. Some research has been done in the development of ERE techniques. Most of the proposed techniques are nonstandard and disjoint. They are not able to match complexities and dynamic nature of AI software. It is important to develop a flexible yet comprehensive framework to handle ethical issues for HCAI software.

We seek to close this crucial gap by developing a novel Ethical Requirement Engineering Framework**.** This framework will be designed specifically for Human Centered AI software. The aim of the study is to identify the strength, limitations and gaps of current ERE techniques. It will be done by a comprehensive literature assessment of current ERE techniques, frameworks and guidelines for AI software.

A novel ethical framework is required to incorporate ethical considerations into requirement engineering phase. The proposed ethical framework will act as an effective tool for developer team to ensure that ethical considerations are included into HCAI software from the beginning. The framework will identify, gather and examine ethical needs and bridge the existing gap between ethical requirements and software specifications. It will lead to ethically and socially responsible advances in cutting edge AI technology. The ultimate goal of the study is to significantly contribute in the field of ethical AI development. It should also help academicians, developers and policymakers to create ethical AI systems that can serve human welfare.

# 2. Literature Review

Human-Centered Artificial Intelligence (HCAI) is one of the major contributing factors of AI development that ensure the creation of software that can complement the human capabilities. According to Shneiderman (2020) defined HCAI as a "system that has the capability to amplify, augment, empower, and enhance human performance". It seeks to develop technologically cutting-edge AI solutions that also align with the ideas of human values, needs, and societal expectations. Ahmad et al. (2021) established that most of the times AI is used to manage RE activities, but, very limited research is done on RE for AI. The concept of ethical AI is still new.

## 2.1 Importance of Ethical Requirement Engineering

The ethical AI is strongly related to HCAI and include the concept of accountability, transparency, fairness etc. As suggested by Dignum (2019), it is important to develop a responsible AI that is effective in terms of technology, along with considering its ethical and societal ramifications. Thus, Ethical Requirement Engineering (ERE) is necessary for the development of HCAI systems. It expands the principles of classic requirement engineering approaches by integrating ethical issues into the software development process. According to Aydemir and Dalpiaz (2018), ERE can be defined as "The elicitation, analysis, and specification of requirements that capture ethical values and norms relevant to the system under development."

ERE is relevant due to apparent need to address ethical issues of a software from the beginning of its development. Vakkuri et al. (2020) pointed out that a lot of ethical problems in AI arises due to choices taken in the early phases of development. Therefore, it is crucial to include ethics in the requirements phase.

## 2.2 Challenges and Issues

There are numerous hurdles in integrating ERE with AI framework. For example, it is difficult to convert impersonal ethical concepts into specific regulations. According to Mehrpouyan et al. (2021), high level ethical principles still need to be operationalized into software specifications. A standard process is required to perform the conversion. Wei Xu et al. (2023) highlight and elaborately explain the challenges in implementing HCAI concepts in AI software.

Emmanouil et al. (2024) also highlighted the importance of understanding and operationalizing various national as well as international policies and guidelines for developing and implementing AI software.

AI systems are developed and used in a variety of settings; new ethical issues may surface later. This changing nature of ethical questions presents difficulties. It may also be possible that the tension between common AI ethical concepts may require tradeoffs and prioritization of one concept over other (Sanderson et. al., 2024). According to Spiekermann (2019), a value-based engineering framework may enable improvement of ethical requirements throughout the system lifecycle. He recommended an iterative and adaptive ERE model.

Multidisciplinary nature of ERE for HCAI may cause further complexity. The ethical requirements can be captured and executed effectively by the complete cooperation of all the stake holders. Therefore, Winfield and Jirotka (2018) stressed the importance of "ethical ecosystem" techniques to unite many points of views. It is essential for constructing ethical AI systems.

There are many challenges to ERE for AI software. Fortunately, many frameworks and techniques are available for this purpose. Alshammari and Hussain (2021) proposed "Ethical Requirements Elicitation Framework". This framework helps the developers to identify ethical requirements for AI software. Hagendorff (2020) presents a thorough taxonomy of AI ethics principles. It may help the researchers for creating ERE procedures. However, as pointed by Ahmad, Abdelrazek et al (2023), there is a large gap in literature and real world. The industry is still using Microsoft office and UML, which greatly hamper the quality and significance of requirements identified for AI software.

ERE is positioned to become more and more important in ensuring that AI systems are designed with ethical considerations at their core as the field of HCAI develops. The ultimate goal of research is to bridge gap between ethical considerations and its real-life application. It will allow the development of ethically conscious, technologically advanced AI systems.

### 2.3 Prominent Research Papers and Findings

| S. No. | Title of Paper | Journal / Conference/ DOI | Year of Publication | Major Findings |
|---|---|---|---|---|
| 1. | State-of-the-Art and Challenges of Engineering ML- Enabled Software Systems in the Deep Learning Era. | **ACM Computing Surveys Vol. 57, No. 10** 57. 10.1145/3731597 | 2025 | The paper explores research in ML-enabled software, highlighting state-of-the-art, challenges, best practices, and future research directions. |
| 2. | Interacting with AI Reasoning Models: Harnessing "Thoughts" for AI-Driven Software Engineering | **arXiv** 10.48550/arXiv.2503.00483 | 2025 | The paper provides a road map to unlock the full potential of AI reasoning models by integrating automated summarization, assumption validation, and multi-model conflict resolution. |
| 3. | Artificial intelligence in educational games and consent under general data protection regulation. | **Sage Journal, Intelligent Decision Technology** 10.1177/18724981251322884 | 2025 | The paper explores data protection challenges in AI-empowered educational games, focusing on user consent and compliance gaps. |
| 4. | Why people trust AI software robots: a mediated moderation perspective on the interaction between their intelligence and appearance. | **Emerald Insight, Industrial Management and Data Systems** 10.1108/IMDS-04-2024-0329 | 2025 | This study provides valuable implications for creating optimal learning performance and realistic appearance that can lead to trust in AI-powered software robots. |
| 5. | Teaching Requirements Engineering for AI: A Goal-Oriented Approach in Software Engineering Courses | **arXiv** 10.48550/arXiv.2411.07250 | 2024 | Requirement Engineering for AI should be different than Traditional RE. Goal-Oriented Requirements Engineering (GORE) can be used for AI-based systems. |
| 6. | Ethical Implications of Integrating AI in Cybersecurity Systems: A Comprehensive Examination | **International Journal of Applied Mathematics and Computer Science** 10.3390/IJMAC/s6030065 | 2024 | The opacity of complex algorithms can lead to a lack of understanding among stakeholders, It is important to ensure transparency and accountability in AI software. Systems. |
| 7. | Revolutionizing Dental Diagnosis with AI: Ethical Considerations in Data Technologies. | **BMC Medical Ethics, Springer Nature** 10.13140/RG.2.2.23811.92965 | 2024 | Patient Privacy, biased dataset and Patient Consent is important in the field of healthcare. |
| 8. | Mapping the landscape of ethical considerations in explainable AI research. | **Ethics and Information Technology, Springer Nature** 10.1007/s10676-024-09773-7 | 2024 | Thoughtful and actionable discussions on how ethics can guide the responsible development and deployment of explainable AI systems should be encouraged. |
| 9. | Ethical Considerations in the Development and Deployment of AI Systems. | **European Journal of Technology, Vol 8** 10.47672/ejt.1890 | 2024 | Maintaining ethical AI requires ongoing evaluation and adaptation to align with evolving technology and societal values. |
| 10. | Towards Extracting Ethical Concerns-related Software Requirements from App Reviews | **39th IEEE/ACM International Conference on Automated Software Engineering** | 2024 | Contextual data regarding ethical concerns can be identified using knowledge graph. |

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| | | 10.1145/3691620.3695294 | | |
| 11. | Implementing Responsible AI: Tensions and Trade-Offs Between Ethics Aspects | **arXiv** 10.1109/IJCNN54540.2023.10191274 | 2024 | There is tension between common AI ethics concepts and it becomes necessary to tradeoff and prioritize one aspect to another. |
| 12. | Responsible artificial intelligence governance: A review and research framework | **The Journal of Strategic Information System, Elsevier** 10.1016/j.jsis.2024.101885 | 2024 | A conceptual framework for responsible AI governance is proposed. |
| 13. | Requirements engineering framework for human-centered artificial intelligence software systems | **Applied Soft Computing, Vol. 143, Elsevier** 10.1016/j.asoc.2023.110455 | 2023 | The proposed approach helps to fully understand the human-centered needs of the project but does not identify error in RE. |
| 14. | Applying HCAI in developing effective human-AI teaming: A perspective from human-AI joint cognitive systems | **arXiv** 10.48550/arXiv.2307.03913 | 2023 | Explain the challenges in implementing HCAI concepts in AI software. |
| 15. | Requirements engineering for artificial intelligence systems: A systematic mapping study | **Information and Software Technology, Vol 158** 10.1016/j.infsof.2023.107176 | 2023 | Several challenges and limitations of existing RE practices were identified. |
| 16. | Towards Requirements Engineering Activities for Machine Learning-enabled FinTech Applications | **Information Technology, WASS** 0.1109/APSEC60848.2023.00022 | 2023 | The lack of domain knowledge, the insatiable nature of ML models, and the rapid changes in financial data pose difficulties in performing RE activities for ML-enabled Fintech system development. |
| 17. | Requirements practices and gaps when engineering human-centered Artificial Intelligence systems | **Applied Soft Computing, Vol. 143, Elsevier** 10.1016/j.asoc.2023.110421 | 2023 | There exists a gap between literature and practices in industry |
| 18. | Ethical Issues in Software Requirements Engineering | **Software, Vol 1, MDPI** 10.3390/software1010003 | 2022 | There are no industry standards, or other rules in place to include ethical aspects in requirement engineering. |
| 19. | A software engineering perspective on engineering machine learning systems: State of the art and challenges | **Applied Soft Computing, Vol. 180, Elsevier** 10.1016/j.jss.2021.111031 | 2021 | There are many challenges in the development of ML systems. |
| 21. | Software Engineering for AI-Based Systems: A Survey | **arXiv** 10.1145/3487043 | 2021 | Identified multiple SE approaches for AI-based systems. |
| 22. | Requirement Engineering for Machine Learning: A Systematic Mapping Study | **47th Euromicro Conference on Software Engineering and Advanced Applications** | 2021 | There is a lack of validated RE techniques especially NFR for ML and difficulties in handling customer expectations. |

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|---|---|---|---|---|
| | | 10.1109/SEAA53835.2021.00013 | | |
| 23. | Requirements engineering challenges and practices in large-scale agile system development. | **JSS, Vol. 12, Elsevier** 10.1016/j.jss.2020.110851 | 2021 | Report the RE challenges, along with best practices from the industry. |
| 24. | Ethics in the Software Development Process: from Codes of Conduct to Ethical Deliberation | **Philosophy and Technology, Vol. 34, Springer Nature** 10.1007/s13347-021-00451-w | 2021 | Ethical thinking needs to be practiced and shaped by the software developers who create and intricately understand the technical system. |
| 25. | Operationalizing AI ethics: barriers, enabler and next steps | **AI & Society, Vol. 38, Springer Nature** 10.1007/s00146-021-01308-8 | 2021 | The whole AI community needs to collaborate to ensure that pro-ethical designing and evaluation is done properly. |
| 26. | ECCOLA - a Method for Implementing Ethically Aligned AI Systems | **JSS, Vol 182, Elsevier** 10.1.16/j.jss.2021.111067 | 2021 | There is a significant gap in this knowledge and need for additional research on the integration of ethical considerations into rapid, iterative development methods. |
| 27. | The Ethics of AI Ethics: An Evaluation of Guidelines | **Mind and Machine, Vol. 30, Springer Nature** 10.1007/s11023-020-09517-8 | 2020 | Presents a thorough taxonomy of AI ethics principles. |
| 28. | Requirements Engineering Challenges in Building AI-Based Complex Systems | **27th International Requirements Engineering Conference Workshops, IEEE** 10.1109/REW.2019.00051 | 2019 | The challenges that arise in RE as a disciplined approach to developing AI-based complex Systems have been identified. |
| 29. | Emotion Oriented requirement engineering: A case study in developing a smart home system for the elderly | **Journal of System and Software, Vol. 147** 10.1016/j.jss.2018.06.077 | 2019 | A requirement engineering method to model emotional goals in software is introduced. |
| 30. | Ethical governance is essential to building trust in robotics and artificial intelligence systems | **Philosophical Transactions of Royal Society, Vol. 376** 10.1098/rsta.2018.0085 | 2018 | The ethical principles are not implemented in practice while developing AI applications and robotics. |
| 31. | An Effective Security Requirements Engineering Framework for Cyber-Physical System | **Technologies, Vol.6, MDPI** 10.3390/technologies6030065 | 2018 | Security for cyber-physical systems has a central role to play in the development. |

## 3. Description of Broad Area

From the past few years, requirement engineering phase of AI software development is seriously considering ethical issues. This section provides a brief introduction to ethical requirement engineering (ERE), its basic concepts and methodologies used during AI development. It also focuses on difficulties faced by developers during integration of ERE in software development life cycle.

***Emergence of ERE in AI*:**

The ethical requirement engineering is an integral part of AI development. It is considered as a crucial component in the development of responsible AI. Dignum et al. (2018) acknowledges that the ethical issues need to be integrated throughout the development lifecycle of AI systems. Therefore, various frameworks and approaches are created to integrate ethical concepts into AI specification in a systematic way.

***Ethical Frameworks and Guidelines*:**

Various ethical frameworks are proposed for the development of AI systems. According to Aydemir et al. (2018), Many ERE approaches are based on ethically aligned design principles. These principles are defined by the IEEE Global Initiative on Ethics of Autonomous and Intelligent Systems Aydemir et al. (2018). Similarly, European Union has published Ethics Guidelines for Trustworthy AI (2019). These guidelines include a number of essential specifications to be fulfilled by AI system. It will greatly impact the development of ethical standard.

***ERE's Value-Sensitive Design*:**

Value-Sensitive Design (VSD) is a well-known ERE method used for AI development. This technique is proposed by Umbrello and van de Poel (2021). It ensures the identification of ethical values and conversion of these values into design requirements. The process also determine the extent of implementing these requirements during the development process.

***Formal Methods in ERE*:**

The use of formal methods to define and validate ethical standards for AI systems can be researched in future. A formal verification approach for autonomous systems is presented by Dennis et al. (2016). This methodology enables the exaction of moral specifications. It also validates the application in artificial intelligence algorithms.

***Stakeholder Involvement in ERE***:

Several scholars have stressed the significance of stakeholder involvement in ERE. Alsheibani et al. (2020) presented a framework to identify ethical requirements with the help of stakeholders. These stakeholders could be end users, ethicists, or subject matter experts. It is an interactive method used to capture a wide range of ethical issues related to AI system.

***Challenges in ERE for AI***:

Various challenges faced by ERE for AI systems are:

a) *Ambiguity in Ethical Principles*: It is difficult to translate abstract ethical principles into specific requirements. The ethical principles are usually abstract. Vakkuri et al. (2020) highlight the difficulty in converting ethical guidelines into practical software requirements.

b) *Dynamic Nature of AI Systems*: It is difficult to recognize ethical requirements of AI systems due to its learning capabilities. Morley et al. (2020) discussed the need for "ethics-aware" requirement engineering.

c) *Interdisciplinary Complexity*: It is important to achieve ERE to ensure the cooperation between several academic fields. These fields may include computer science, ethics, and domain-specific knowledge. According to Van de Poel (2020), it is still difficult to incorporate various ethical concerns into a cohesive requirement engineering process.

d) *Lack of Standardization*: It is still not possible to established standard methods for ERE in artificial intelligence. It is irrespective of the fact that a number of frameworks and methodologies have been proposed. According to Hagendorff (2020), the variation in development process may result in irregular implementation of ethical standards.

**Issues in Ethical Requirement Engineering**

Although Ethical Requirement Engineering (ERE) for Human-Centered AI (HCAI) has advanced significantly, yet several important gaps are still existing. It is essential to identify these gaps to create effective frameworks.

***Operationalization of Ethical Concepts***:

The major problem in implementing ERE for HCAI is to convert abstract ethical concepts into specific criteria. Morley et al. (2020) proposed that there is a disconnection between ethical issues and its implementation. Most of the current frameworks fail in the translation process.

***Contextual Adaptability***:

Current ERE frameworks use same yardstick to all the AI software. This one-size-fits-all stance causes the exclusion of context-specific considerations during the deployment of AI systems. Dignum (2019) proposed that ethics in AI software require more context-sensitive methods. Further research is required to create flexible ERE approaches. These approaches should be able to accommodate various social, cultural, and application-specific situations.

***Handling Ethical Conflicts***:

It is difficult to resolve conflicts between several ethical concepts. The issue is frequently ignored by current researchers. According to Timmermans et al. (2020), most of the time, ethical concepts are frequently in conflict with each other. The requirement engineering process lacks systematic methods to resolve ethical conflicts.

***Stakeholder Engagement***:

The involvement of stakeholders in ERE is well established. However, formal ERE approaches lack in involving stakeholders in effective manner. According to Alsheibani et al. (2020), it is necessary to have inclusive and interactive methods for elicitation of ethical requirements.

# 4. Objectives of the Study

## 4.1 Problem Statement

This study aims to explore the ethical challenges inherent in Requirement Engineering (RE) for Human-Centered AI software, assess current impediments to implementing ethical principles, investigate prevalent strategies in integrating ethics into RE practices, and proposes a validated comprehensive framework for Ethical Requirement Engineering (ERE) specific to Human-Centered AI.

## 4.2 Research Objectives

**RO1:** To investigate the ethical issues and challenges involved in integrating ethical considerations during the Requirements Engineering phase of Human-Centered AI software.

**RO2**: To analyze contemporary approaches in Requirement Engineering for Human-Centered AI software.

**RO3:** To develop a framework for implementing Ethical Requirement Engineering (ERE) for Human-Centered AI.

**RO4:** To compare and validate the proposed framework.

## 5. Methodology

This work is based on the concept of identifying various ethical concerns of AI software in the requirement engineering phase of software development process. The methodology to be adopted for developing a robust Ethical Requirement Engineering Framework (Figure 1).

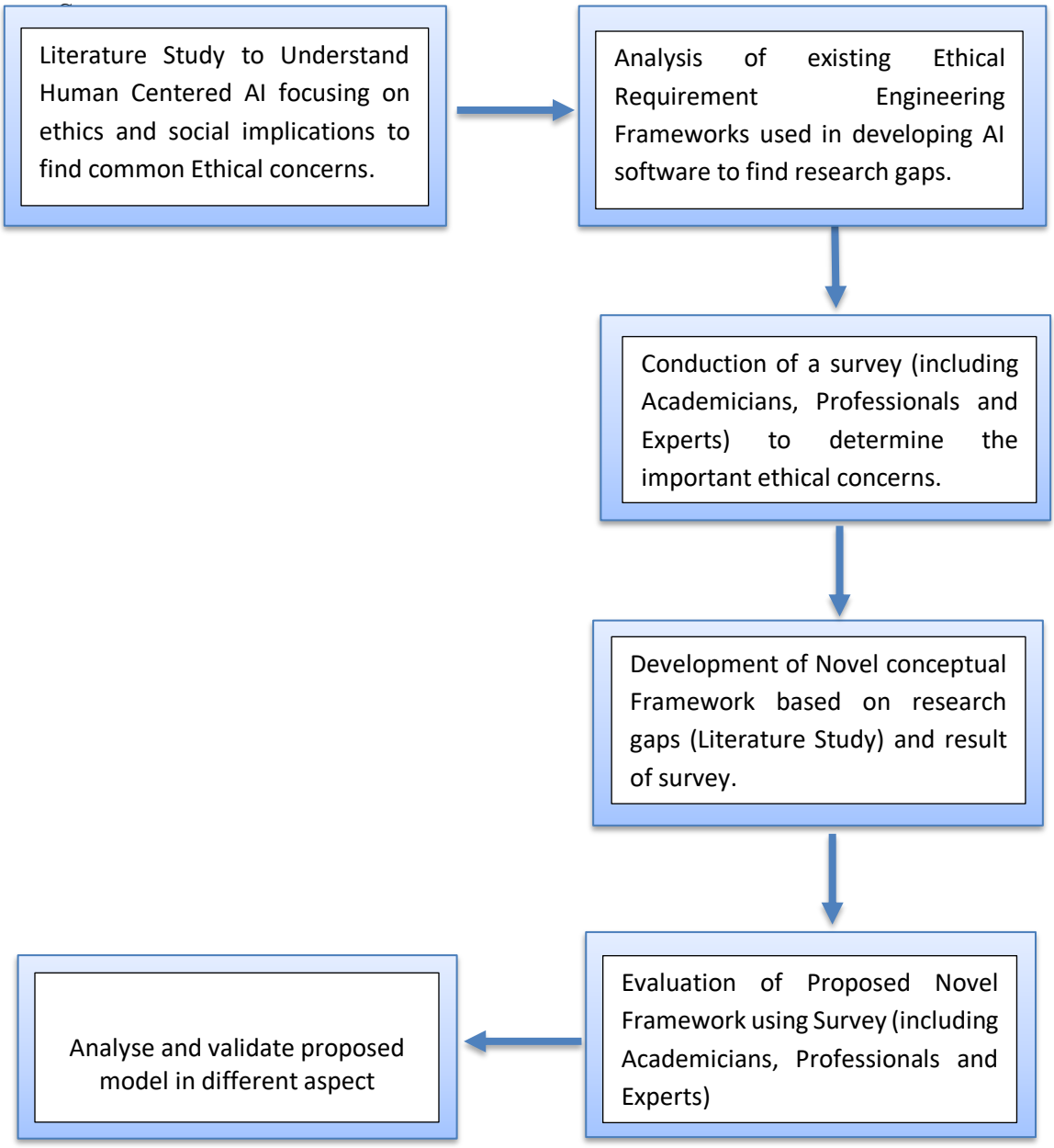
Literature Study to Understand Human Centered AI focusing on ethics and social implications to find common Ethical concerns.
Analysis of existing Ethical Requirement Engineering Frameworks used in developing AI software to find research gaps.
Conduction of a survey (including Academicians, Professionals and Experts) to determine the important ethical concerns.
Development of Novel conceptual Framework based on research gaps (Literature Study) and result of survey.
Evaluation of Proposed Novel Framework using Survey (including Academicians, Professionals and Experts)
Analyse and validate proposed model in different aspect

**Figure 1 Proposed Methodology to Develop Conceptual Framework for Ethical Requirement Engineering**

Step 1: Identification of the ethical concerns and their inter relationship. The identification will be done by extensive literature study.

Step 2: Various existing ERE frameworks for HCAI will be analyzed to find research gaps.

Step 3: A survey will be conducted among industry professionals, academicians and industry experts to identify common ethical concerns.

Step 4: A conceptual framework will be developed that can incorporate Ethical Requirement Engineering (ERE) for Human Centered AI.

Step 5: The framework will be validated by conducting a survey among experts.

Step 6: The analysis and validation of proposed framework will be done in various aspects.

# 6. Expected Outcome of the Research

- Identification of ethical issues and challenges in their integration to the AI system.
- Comparative analysis of current approaches in ethical requirement engineering (ERE) for Human-Centered AI.
- Novel framework development based on identified gaps in current research.
- Analysis and validation of proposed framework.

**Potential Future Research Paths**

The process of AI software development will be greatly benefitted by the proposed framework due to its capability of identifying ethical issues. However, there are many areas that may require further advancement in later stages.

*Validation and Refinement*: The efficiency of framework can be confirmed by conducting the empirical research in various applications and development areas. The discrepancies can be used for further refinement of framework.

*Tool Development*: It may be possible to develop a software tool for resolving ethical disputes.

*Long-term Impact Assessment*: It is possible to analyze the effect of framework on behavior of AI software.

*Education and Training*: In future, it is also possible to create courses and training plans for AI professionals regarding ethical requirement engineering.

It is possible to resolve new ethical issues in AI in future. It may involve sophisticated machine learning methods, cooperation between humans and AI, and the growing autonomy of AI systems.

## 7. Conclusion

Ethically aware AI systems are essential to maximize positive effects of AI software. It becomes more crucial as the AI software are incorporated into more essential facets of society. The study provides a thorough examination of present condition of ethical requirement engineering for human-centered artificial intelligence. It also helps to identify the list of the main obstacles and weaknesses in the current methodologies. The use of ERE in HCAI will improve human capabilities along with upholding fundamental ethical principles and societal values.

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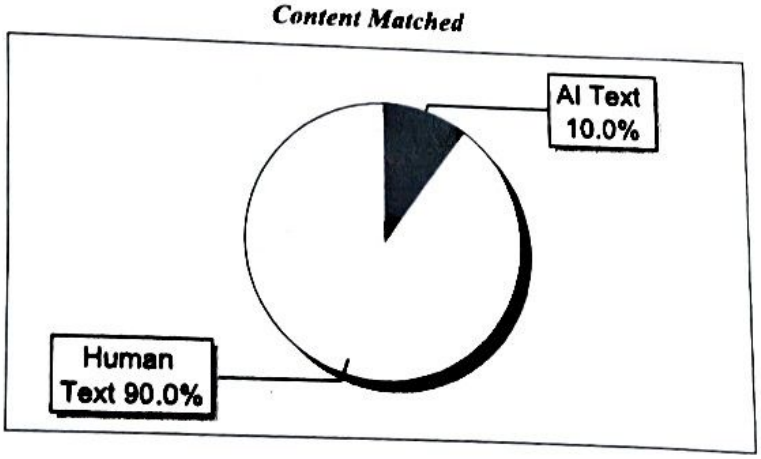


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